

CHEMISTRY 59-230/232

FIRST TEST

Time 50 Min

October 11, 2001

NAME: _____

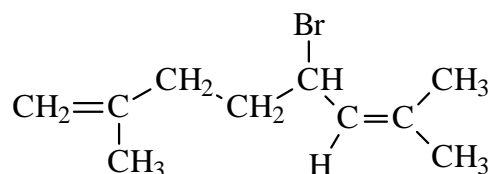
ID #: _____

LABORATORY DAY: _____

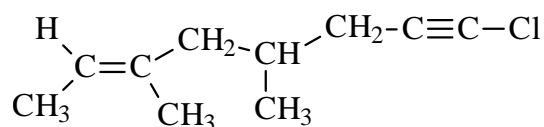
READ ALL QUESTIONS CAREFULLY AND ANSWER THE QUESTION ASKED!! Answer all questions on the test paper. An extra sheet has been attached for rough work which will not be marked. Only the FIRST answer to any question will be considered. Point values for each question are given. There are 6 questions and 4 pages in this test and the available points total 100.

1. Give an acceptable IUPAC name for each of the following structures. Make sure your name includes stereochemistry where this is required. [5 points each]

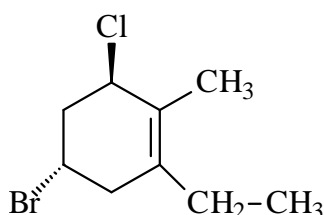
(a)



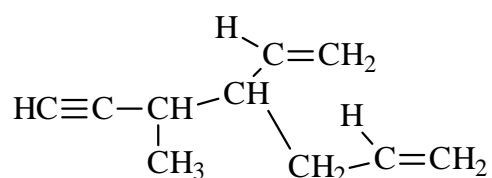
(b)



(c)



(d)



2. Draw structures which correspond to each of the following names. Drawings that show only carbon and other non-hydrogen atoms are acceptable. Make sure your drawings indicate stereochemistry where this is required. [5 points each]

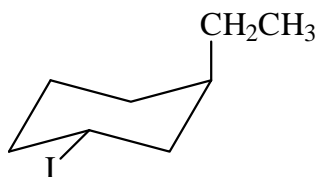
(a) E 3-chloro-6,6-dimethyl-3-heptene

(b) 3-bromo-3-chloro-6-methylhept-5-en-1-yne

(c) 2,5,6-trimethyl-1,4-cycloheptadiene

(d) Z 1-bromo-1,2-dichloro-4-[1-cyclopentyl]-1-butene

3. (a) For the following structure, answer the questions asked. [2 points each]



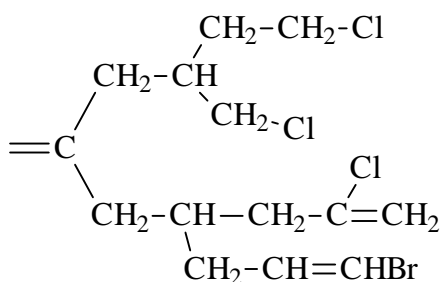
(i) Give the IUPAC name including stereochemistry

(ii) label the substituents as either axial (a) or equatorial (e)

(iii) Is this the most stable configuration?

(iv) Is this the most stable chair conformation?

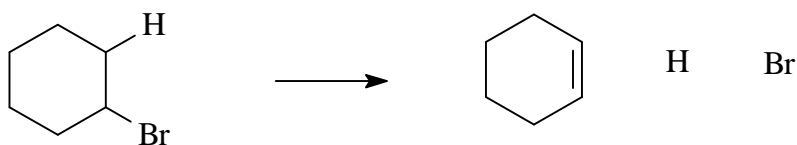
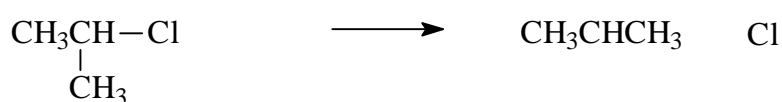
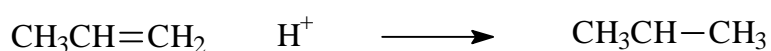
(b) In the following partial structure, indicate which of the chains has the higher priority and show how you arrived at your decision. [5 points]



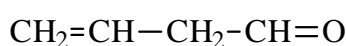
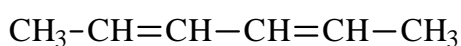
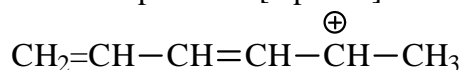
(c) The molecule with the trivial (non-IUPAC) name “decalin” has the molecular formula $\text{C}_{10}\text{H}_{18}$. Indicate what can be determined about its structure from this information. [5 points]

(c) Draw the NEWMAN PROJECTION of 1-isopropyl-4-methylcyclohexane in its more stable chair conformation and its less stable configuration. Label the substituents as axial or equatorial. [10 points]

4. (a) Draw the “curly arrows” that describe each of the following transformations and place charges on the products where they are required. [3 points each]



(b) For those structures shown below for which resonance is possible, draw as many resonance structures as possible. [9 points]



5. (a) [4 points] On the axes below, draw the energy reaction coordinate profile for:
- the reaction between cyclohexene and hydrogen chloride
 - the reaction between two molecules A and B which occurs in three steps, A is involved in the first step and B in the second step and the third step is the slowest one.

(b) give the form of the rate equation for each reaction. [4 points]

(i)



rate

(ii)



rate

6. Indicate whether each of the following statements is TRUE [T] or FALSE [F]. Note that for a statement to be true, all parts of the statement must be true!. [2 points each]

- The physical properties of geometric isomers are always different []
- sp^3 hybridized carbons are always bonded to four other atoms []
- water is a nucleophile []
- “curly arrows” always show the movement of atoms []
- the oxygen in the product of the addition of water to an alkene comes from OH^- []
- resonance involves only δ electrons []